

REMARKS/ARGUMENTS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments, and the following remarks. Claims 1-26 are in the application. Claims 1, 3, 7, 12, 19 and 21 have been amended. Claims 20 and 23 have been canceled. Claims 27 and 28 have been added. No new matter has been added.

The Examiner objected to claim 21 for grammatical errors. Applicants have amended claim 21 to recite a range of 450-600 nm, as was recited in the original claim.

The Examiner rejected claims 1, 3-4, 6-8 and 17 under 35 U.S.C. §102(b) as being anticipated by Conversano et al. Claims 19-20 and 23 are rejected as being anticipated by Slatter et al. Claim 5 is rejected as being unpatentable over Conversano et al., in view of Fantone et al. Claims 9-11 are rejected as being unpatentable over Conversano et al., in view of Seo. Claims 12-14 are rejected as being unpatentable over Conversano et al., in view of Reed et al. Claims 15-16 are rejected as being unpatentable over Conversano et al., in view of Slatter et al. Claims 18 and 24-26 are rejected as being unpatentable over Conversano et al., in view of Honda. Claims 21-22 are rejected

as being unpatentable over Slatter et al., in view of Seo.

Applicants respectfully traverse.

Applicants have amended claim 1 to claim a screen made of a light impervious material part near the image fitting surface. Support for this amendment can be found in the specification on page 18, second to last paragraph.

In Conversano (5,256,866) the optical axis beam, in the region in which it strikes the image to be captured, in fact runs at an angle of more than 5 degrees to the surface normal. An embodiment of the present invention without a mirror would not incur any significant disadvantages. The more compact structure and/or the flexibility in the arrangement of the image capturing unit relative to the object plane/image fitting surface is bought in terms of an increased complexity of design.

Guiding the (illumination source) light beam essentially parallel to the optical (capture) axis has two advantages. Firstly it is in general simpler to embody in a design (and therefore cheaper), since the arrangement of illuminants in immediate proximity to the image capturing unit is beneficial (supply with electrical energy, common utilization of attachment means), and with such an arrangement of the illumination beam it

automatically runs approximately parallel to the capture axis without the use of further (expensive) optical elements (mirrors, prisms, beam dividers, ...). Camera modules with built-in illumination sources today are available relatively inexpensively as mass-market products (they are used e.g. in manual reader units - similar to the reader pistols at hardware store cash tills).

The second advantage has to do with the suppression of reflections and is linked with the inclined orientation of the optical axis. The object of the present invention is the avoidance of damaging reflections, in particular in the case of surfaces generating specular reflections. Here, reflections of the illumination source are particularly critical, because the actively bright illumination elements naturally possess a much higher illuminating power than the surrounding objects. While a reflection of the camera on the surface only affects the quality of the image captured, a reflected illumination element often leads to a complete loss of the image information in the region of the reflection (similar to the capture of a camera in the mirror, with the flash unit switched on). If the capture angle is selected such that the camera is not reflected in the surface, then the same applies for illumination elements at the same angle. In brief, the parallel guidance of illumination beam and

capture beam enables image captures in which damaging reflections of the illumination source are avoided – however, this is only the case if the (common) angle of these two beams is suitably selected.

In Conversano, the windows essentially serve ergonomic purposes. In use, the user must guide the reader pen over the lines to be read, and this is made more difficult in that the pen partially covers the lines. According to the Conversano, this difficulty is alleviated by the windows at the front end of the pen and by the inclined orientation of the optical axis.

These windows are in fact disadvantageous for a low reflection capture, and in the present invention, the housing or screen in the region of the image to be captured should in fact be essentially nontransparent and be made from a reflection reducing material. This applies in particular to the side facing away from the image capturing unit, as can be seen from Fig. 2 and Fig. 3. Light coming from this side should either by means of the screen, as in the drawing, or by means of a housing component functioning as a screen be kept at a distance. In Conversano, the windows are located exactly at this critical location.

The advantages of illumination source light beam running parallel to the optical capture axis are as follows:

a) Enables cost-effective structure. Both the camera and also illumination elements require electrical connections. It is cost-effective to construct the camera and illumination elements e.g. in the same housing on the same PCB, because as a result additional electrical means of connection that would otherwise be required and/or additional means of attachment can be eliminated. If the camera and illumination sources are in direct proximity the illumination beam runs almost exactly parallel to the optical capture axis.

b) If the arrangement in total is structured by a suitable selection of angles such that the camera cannot reflect within its own visual field in the display to be captured, then this also applies without significant further modifications to illumination elements in direct proximity to the camera. One therefore ensures in a simple manner of design that no damaging reflections ensue as a result of the illumination source.

Claim 3 has been amended to state that the angle α is smaller than 30 degrees. Conversano discloses an angle of 30 degrees, and mentions the possibility of selecting another

(larger) angle.

Regarding claim 5, the Examiner confuses stop number of 5.6 cited by Fantone, which describes a ratio of stop opening to focal length, with the ratio of claim 5, which describes the sensor diagonal to focal length. At the location specified, Fantone has not disclosed this ratio. The use of a telescopic characteristic in conjunction with the other features of Claim 1 for the reduction of reflections are not obvious.

Claim 6: No modification. Is also not described at the specified location.

Claim 7 has been amended to recite that the optically active element is in the optical capture path. In Conversano, the light source indeed lies "roughly" between camera and image fitting surface, but is however displaced laterally to the extent that the light source lies outside the optical path (otherwise it would in fact cover the image being captured).

Regarding claim 10, Seo has by no means disclosed direct proximity of the illumination source to the camera. Fig. 4 of Seo shows a functional block diagram that does not allow any kind of conclusions to be drawn concerning the physical arrangement of the building blocks.

Regarding claims 12 and 13, the combination of Conversano with the Reed optical screen would be not obvious. Such a combination would run counter to the object of Conversano (to enable the user to view the surface to be scanned). It is illogical, and therefore for the person skilled in the art also by no means obvious, to "modify" the invention of the window glass (which achieves the object of guaranteeing a free line of sight) with the invention of the visual protection fence (which achieves the object of preventing uncontrolled penetration of light), and therefore to nail the windows together with the visual protection fence.

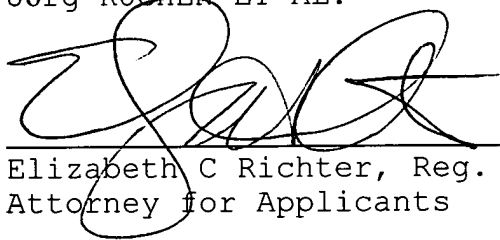
Regarding claim 14, at the location described, no light absorbing surface is disclosed. There it is simply an "opaque housing", in other words a nontransparent housing, which is disclosed.

Regarding claim 26, Honda in the abstract does not disclose the purpose of code reading in "for reading an optical code". Honda relates in particular to overhead projectors, not to code reader units. Applicant has also added claim 27 to claim that the device is used for reading an optical code that is located completely in the visual field of an image capturing unit.

Claim 28 has also been added to specify that the reflection reducing part of claim 16 is a translucent glass window. Support for this amendment can be found in the specification on page 19, third full paragraph.

Accordingly, Applicant submits that the claims are patentable over the cited references, taken either singly or in combination. Early allowance of the amended claims is respectfully requested.

Respectfully submitted,
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Enclosure: Petition for a one month extension of time
RCE and check for \$405.00

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